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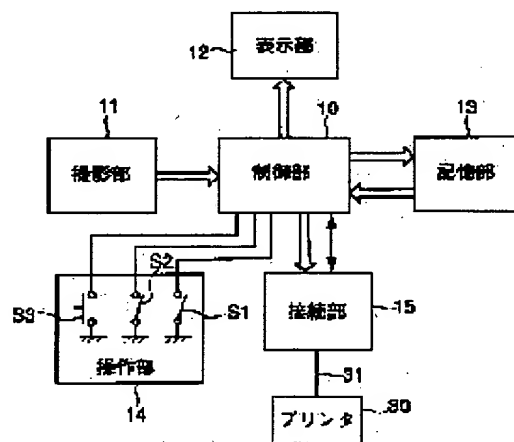
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(54) ELECTRONIC STILL CAMERA

(57)Abstract:

PROBLEM TO BE SOLVED: To efficiently provide the performance of external device and to improve efficiency in the transmission of images to the external device by knowing the characteristics of external device through communication with that device, generating image data corresponding to the known characteristics and transmitting these data to the external device.

SOLUTION: When all the switches at an operating part 14 are turned on, a control part 10 communicates with a printer 30 through a connection part 15. When the printing density of printer 30 is higher than 600 dpi, for example, the control part 10 reads image signals from a memory card, generates an image data of 640×480 pixels and outputs these data to the connection part 15. When the printing density is lower than 600 dpi, the control part 10 generates the image data of 320×240 pixels and outputs them to the connection part 15. Then, the control part 10 generates and outputs these image data in succession for all the images which are stored in the memory card.



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CLAIMS

[Claim(s)]

[Claim 1] The electronic "still" camera characterized by communicating with external equipment and generating the image data which carries out learning of the property of the equipment, and transmits it according to the property which carried out learning in the electronic "still" camera which transmits the image data showing the photoed image to external equipment.

[Claim 2] Said property is an electronic "still" camera according to claim 1 characterized by being the resolution of an image.

[Claim 3] The equipment of said exterior is an electronic "still" camera according to claim 1 or 2 characterized by being the airline printer which prints the image which image data expresses.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the electronic "still" camera which transmits the photoed image to an external device in more detail about an electronic "still" camera.

[0002]

[Description of the Prior Art] In the electronic "still" camera, indicating the image which memorized the photoed image to the flash memory, the memory card, etc., and has been memorized by playback at the display with which the camera was equipped is performed. An electronic "still" camera is not equipped with an airline printer, but he is trying to save an image by transmitting an image to an external airline printer and printing it generally.

[0003] There are various models in an airline printer from the simple thing which has low resolution to the thing of high performance with very high resolution, and an airline printer connectable with an electronic "still" camera is not restricted to 1 model. A user can choose an airline printer according to an application, and can get the printing image of desired resolution. If directions of printing of an image are given, an electronic "still" camera reads the memorized image, generates the image data for printing with fixed procedure, and sends it out to the airline printer to which this is connected.

[0004] In recent years, transmitting an image to a personal computer from an electronic "still" camera, and carrying out various processings of printing of an image, a display, preservation, composition, etc. with a personal computer has also come to be performed. Also when transmitting an image to a personal computer, an electronic "still" camera generates image data with fixed procedure.

[0005]

[Problem(s) to be Solved by the Invention] However, since he is trying for fixed procedure to always generate the image data for printing irrespective of the property of the airline printer connected, the problem has produced the conventional electronic "still" camera in the quality of the time amount which printing processing takes, or a printing image. An airline printer performs infanticide processing to image data, when the image data of the high resolution more than self print resolution is able to be given, conversely, when the image data of the low resolution below self print resolution is able to be given, it performs interpolation processing to image data, and it prints an image.

[0006] Originally the image data operated on a curtailed schedule is unnecessary for printing of an image, and if this garbage data is transmitted, naturally the time amount which transmission takes will become long. On the other hand, although futility is not produced in air time when transmitting the image data of a low resolution, the image of the high resolution photoed even if it performed interpolation processing cannot be reproduced, but the quality of a printing image deteriorates compared with the case where the image data of high resolution can be given.

[0007] For this reason, with the conventional electronic "still" camera, when a simple airline printer was used, printing processing took the long time comparatively [with the low resolution of a printing image], and even if it used the airline printer of high performance, by some generate the image data of a low resolution, there was unarranging [that that engine

performance could not fully be demonstrated] at some which generate the image data of high resolution. Moreover, both problems had arisen in what generates the image data of the resolution of whenever [middle].

[0008] It generates, not only an airline printer but when transmitting an image to other equipments, such as a personal computer, and long duration is superfluously required by completion of reception from transmitting initiation, or these problems cause deterioration of the image which it regenerates by the external device, or the image memorized.

[0009] The effectiveness of this invention of transmission of the image to external devices, such as an airline printer, is good, and the engine performance of an external device aims at offering the electronic "still" camera fully demonstrated.

[0010]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, it communicates with external equipment, the image data according to the property which carried out learning of the property of the equipment, and carried out learning is generated, and it is made to transmit to external equipment in this invention in the electronic "still" camera which transmits the image data showing the photoed image to external equipment. The property of the equipment of the exterior which carries out learning by communication is the resolution of an image, and external equipment is an airline printer which prints the image which image data expresses.

[0011] If an electronic "still" camera generates the image data transmitted according to the resolution of an external device, generating the image data of the high resolution which an external device cannot utilize, or generating the image data of a low resolution which cannot employ resolution of external equipment efficiently will be avoided. When transmitting image data to an airline printer, the printing image with which the engine performance of an airline printer was fully demonstrated by generating and transmitting the image data according to the property can be obtained by the appropriate time amount corresponding to the image quality.

[0012]

[Embodiment of the Invention] Hereafter, 1 operation gestalt of the electronic "still" camera which applied this invention is explained with reference to a drawing. The appearance which looked at the electronic "still" camera 1 (only henceforth a camera) of this operation gestalt from the back slanting upper part to drawing 1 is shown. The camera 1 equips the front face of the body with the connector 27 which equips the side face of a card slot 26 and another side with the cable 31 for connecting with a finder 22, a color liquid crystal display (LCD) 23, electric power switch SM, and two switches S1 and S2 at a taking lens 21 and a tooth back, and connecting with the external printer 30 for image printing on the top face at release ** 24 and a dial 25, and a side face.

[0013] A camera 1 makes the light-receiving side of a charge-coupled device (CCD) carry out image formation of the light from a photographic subject with a taking lens 21, and takes a photograph electronically by CCD. The photoed image is memorized to the memory card inserted from the card slot 26. The switch S3 (un-illustrating) is formed in release ** 24, and a switch S3 is turned on when release ** 24 is pushed in.

[0014] A camera 1 transmits the photography mode which photos an image and is memorized to a memory card, the playback mode which reproduces the image memorized to the memory card and is displayed on LCD23, and the image memorized to the memory card to a printer 30, and has three modes of operation of the print mode which prints an image in a form by the printer 30. These modes are switched by a user's manual operation by switches S1 and S2. Initiation of photography with photography mode, modification of the display image in a playback mode, and initiation of printing by the print mode are directed by ON of a switch S3.

[0015] Photography can be performed by choosing either the person mode suitable for the usual photography of the macro mode suitable for photoing the photographic subject of a short distance, person photography, etc., and the sport mode suitable for photoing the early photographic subject of a motion, and these are switched by the dial 25.

[0016] It does not always connect with the camera 1, and a printer 30 is connected when a user equips a connector 27 with a cable 31 at the time of printing. It is possible to connect various

printers to a camera 1, and the resolution of the printed image changes with engine performance of a printer.

[0017] The outline configuration of a camera 1 is shown in drawing 2. The configuration of a camera 1 is divided roughly into the photography section 11, a display 12, the storage section 13, a control unit 14, a connection 15, and a control section 10. The photography section 11 consists of the amplifier which amplifies the output signal of a taking lens 21, CCD which changes the taking-lens transmitted light into an electrical signal, and CCD, the A/D converter which changes the amplified analog signal into a digital signal, and the CCD driver which drives CCD, and a display 12 consists of the LCD driver which drives LCD23 and LCD23 which display a playback image.

[0018] The storage section 13 consists of the card driver which performs the I/O to a memory card and a memory card, and the switch S3 formed in a switch S1, a switch S2, and release ** 24 is included in a control unit 14. A connection 15 consists of the transceiver circuit which processes the connector 27 for equipping with a cable 31 and transmission, and reception.

[0019] A control section 10 consists of a microcomputer and performs processing of an image and control of each part of the above. It processes the signal from the photography section 11, generate a picture signal, and the storage section 13 is made to specifically memorize a picture signal, if it is in photography mode, and it is in a playback mode, the picture signal read from the storage section 13 is outputted to a display 12, and an image is displayed. If it is in a print mode, the picture signal read from the storage section 13 is processed, the image data for printing is generated, and this is transmitted to a printer 30 from a connection 15.

[0020] A control section 10 determines a mode of operation between photography mode, a playback mode, and a print mode according to a setup of the switches S1 and S2 of a control unit 14. The relation between switches S1 and S2 and a mode of operation is shown in drawing 3. It becomes stop mode when both the switches S1 and S2 are OFF. At this time, a control section 10 does not operate each part of a camera 1. By ON, a switch S1 serves as photography mode, when a switch S2 is OFF, and in OFF, a switch S1 serves as a playback mode, when a switch S2 is ON. It becomes a print mode when both the switches S1 and S2 are ON.

[0021] In advance of printing of the image in a print mode, a control section 10 requires that properties, such as the print consistency and print size, should be transmitted to a printer 30, and generates the image data for printing based on the property information transmitted from the printer 30. Therefore, if the image data for printing transmitted to a printer 30 becomes a thing according to the property of a printer 30 and the models of printer connected differ, the image data which a control section 10 generates will differ.

[0022] A control section 10 can generate two kinds, image data with many pixels, and image data with few pixels, and switches these according to the height of the print consistency of a printer 30, i.e., resolution. The concrete relation of the number of pixels of image data which the print consistency and control section 10 of a printer 30 generate is shown in drawing 4. A control section 10 generates the image data of 480 x 640 pixels, when the print consistencies of a printer 30 are more than 600 dots per inch (dpi), and when a print consistency is less than 600 dpi, it generates the image data of 240 x 320 pixels.

[0023] Therefore, the time amount which transmission of data takes to a print consistency by setting to one fourth the amount of the image data transmitted compared with the time of the printer of 600 or more dpi being connected when the printer of less than 600 dpi is connected also becomes abbreviation 1/4.

[0024] The flow of the control processing which a control section 10 performs is shown in drawing 5. First, the condition of switches S1, S2, and S3 is detected (step # 5), and it judges whether both the switches S1 and S2 are ON (#10). If both the switches S1 and S2 are ON, when waiting (#15) and a switch S3 will be turned [that a switch S3 is turned on and] on, all images are read from the storage section 13, and it processes for printing (#20).

[0025] The flow of processing for printing is shown in drawing 6. A control section 10 communicates with a printer 30 through a connection 15, the property information is acquired (step # 105), and it judges whether the print consistency of a printer 30 is 600 or more dpi (#110). When a print consistency is 600 or more dpi, a picture signal is read from a memory card,

640x480-pixel image data is generated, and this is outputted to a connection 15 (#115). When a print consistency is less than 600 dpi, a picture signal is read from a memory card, 320x240-pixel image data is generated, and this is outputted to a connection 15 (#120).

[0026] A control section 10 performs generation and the output of the above-mentioned image data in order about all the images memorized to the memory card. Therefore, printing of all the memorized images is performed by one printing instruction by step #15 of drawing 5. After outputting the last image data to a connection 15, processing returns to step #5 of drawing 5.

[0027] # If both both [one side or] S1 and S2 are OFF in the judgment of 10, it will judge whether a switch S1 is ON (#25). If a switch S1 is ON, it judges further whether a switch S3 is ON (#30), and a photograph will be taken when a switch S3 is ON (#35). That is, a picture signal is generated and the storage section 13 is made to memorize this from the output of the photography section 11. When the switch S3 after photography is OFF, processing returns to step #5.

[0028] # It judges whether if a switch S1 is OFF in the judgment of 25, a switch S2 is ON (#40), and if a switch S2 is OFF, it will return to step #5. If a switch S2 is ON, the first image will be read from the storage section 13, it will display on a display 12, and an image will be reproduced (#45). Subsequently, it judges whether a switch S3 is ON (#50). If a switch S3 is turned on in predetermined time, a display image will be changed by reading the following image from the storage section 13, and displaying on a display 12 (#55). And it returns to step #50. # If a switch S3 is not turned on in predetermined time by 50, return to step #5.

[0029] A control section 10 detects the condition of switches S1, S2, and S3 again by step #5 after each processing of photography, playback, and printing, and performs processing of photography, playback, or printing according to a setup of switches S1 and S2.

[0030] In addition, although this operation gestalt explained the example which sets the number of pixels of the image data for printing as two steps according to the height of the print consistency of a printer, a print consistency is distinguished more finely and you may make it set up the number of pixels of image data more than a three-stage. If it is made such, even when the printer of what kind of print consistency is connected, it becomes possible to fully demonstrate the engine performance of the printer, and even the printer of high resolution can be extremely used effectively from the printer of a low resolution. Moreover, the time amount which printing processing takes according to the resolution of a printing image is finely changeable.

[0031] An external display is connected to the electronic "still" camera of this invention, and you may make it display an image with an external display. By generating the image data for a display also in this case according to the resolution of a display of an indicating equipment, while avoiding unnecessary data transmission, the engine performance of an indicating equipment can fully be employed efficiently. Moreover, a personal computer is connected to an electronic "still" camera, image data is transmitted, and printing, display, composition of an image, etc. are processed with a personal computer, or you may make it store an image in the storage. If the image data according to the property of the processing performed with a personal computer also in that case is generated, transmission of unnecessary data is avoidable.

[0032]

[Effect of the Invention] Since the engine performance of an external device can fully be demonstrated when based on the electronic "still" camera of claim 1, the external device of high performance does not become useless. Moreover, since transmission exceeding the engine performance of an external device of useless image data is avoidable, the whole processing effectiveness improves.

[0033] In the electronic "still" camera of claim 2, while avoiding transmission of the useless image data which does not contribute to improvement in the resolution of an image, image data required in order not to reduce the resolution of an image can be transmitted. Therefore, keeping high the quality of the image obtained by processing of an external device, the processing time can be shortened so that image quality may be balanced.

[0034] In the electronic "still" camera of claim 3, even when what kind of airline printer is connected, since the engine performance of the airline printer is fully demonstrated, the nature printing image according to the engine performance of equipment can be obtained. Moreover,

although printing is processing which requires time amount, the time amount which printing takes can be shortened by avoiding transmission of unnecessary image data.

[Translation done.]